of the position to which the cleaning robot is moved while the cleaning robot rotates at a predetermined angle or 360 degrees in place without unnecessary movement, thereby reducing a time required for the localization.

[0204] In addition, after the localization of the cleaning robot, information indicating that the localization is completed may be notified through a display or sound, thereby increasing user's reliability for a product.

[0205] In addition, the traveling direction of the cleaning robot may be determined using the environmental map in which the cleaning robot performs an operation and the position of the cleaning robot on the environmental map, and therefore a more accurate traveling direction may be determined so that a cleaning omission area is not generated, thereby improving reliability for a cleaning operation.

[0206] Although a few embodiments of the present disclosure have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the disclosure, the scope of which is defined in the claims and their equivalents.

What is claimed is:

1. A cleaning robot comprising:
a main body;
a driving unit that moves the main body;
a data acquisition unit to acquire actual sensor data by measuring a distance from a current position to an object to be measured;
a local map acquisition unit to acquire a local map by scanning the vicinity of the current position based on an environmental map stored in advance; and
a processor to determine coordinates of the current position for the local map by performing matching between the local map and the actual sensor data, and to determine a traveling direction based on the current position by calculating a main segment angle of a line segment existing in the local map.

2. The cleaning robot according to claim 1, wherein the processor determines the main segment angle by classifying a plurality of straight lines existing in the local map according to angles.

3. The cleaning robot according to claim 1, wherein the processor rotates the traveling direction of the cleaning robot in place on the basis of the traveling direction determined based on the coordinates of the current position.

4. The cleaning robot according to claim 1, wherein the data acquisition unit is configured to acquire one or more of the actual sensor data in a state in which the cleaning robot is stopped, the actual sensor data while the cleaning robot rotates at a predetermined angle in place, and the actual sensor data for all directions while the cleaning robot rotates at an angle of 360 degrees in place.

5. The cleaning robot according to claim 1, wherein the local map acquisition unit extracts virtual sensor data by performing a ray casting method on all directions while the cleaning robot rotates at an angle of 360 degrees in a virtual sensor data extraction position selected with respect to the current position of the cleaning robot, and thereby acquires the local map.

6. The cleaning robot according to claim 1, wherein the local map acquisition unit extracts the local map having a predetermined size with respect to each of a plurality of local map extraction positions selected with respect to the current position of the cleaning robot, from the environmental map.

7. The cleaning robot according to claim 1, wherein the processor includes:
a position estimation unit to determine current position coordinates of the cleaning robot for the local map,
a segment angle calculation unit to calculate a main segment angle of a line segment existing in the local map, and
a direction adjustment unit to rotate the traveling direction of the cleaning robot in the current position according to the main segment angle.

8. The cleaning robot according to claim 7, wherein the position estimation unit includes:
a corresponding point acquisition unit to acquire a plurality of corresponding points through data matching between the actual sensor data and the local map,
a relative position calculation unit to calculate a relative position of the actual sensor data for the local map using the acquired plurality of corresponding points,
a similarity calculation unit to calculate similarity between a plurality of local maps and the actual sensor data, and
a position determination unit to determine a relative position of the cleaning robot for the local map having the highest similarity as the current position of the cleaning robot for the environmental map, and thereby determine the current position coordinates.

9. The cleaning robot according to claim 8, wherein the similarity calculation unit obtains higher similarity along with an increase in the number of data points which are commonly included in the local map and the actual sensor data.

10. The cleaning robot according to claim 7, wherein the segment angle calculation unit includes:
a straight line acquisition unit to acquire a plurality of straight lines from the local map, and
a main segment angle calculation unit to classify the plurality of straight lines according to angles and to determine the main segment angle.

11. The cleaning robot according to claim 1, further comprising a sensor that measures the distance,
wherein the data acquisition unit acquires the actual sensor data by measuring the distance from the sensor to the object to be measured using the sensor.

12. A control method of a cleaning robot, comprising:
acquiring a local map by scanning the vicinity of a current position;
acquiring actual sensor data by measuring a distance from the current position to an object to be measured;
determining current position coordinates for the local map by performing matching between the local map and the actual sensor data;
determining a traveling direction by calculating a main segment angle of a line segment existing in the local map; and
adjusting the traveling direction according to the calculated main segment angle.

13. The control method of the cleaning robot according to claim 12, wherein the acquiring of the local map includes acquiring the local map by scanning the vicinity of the current position based on an environmental map stored in advance in which the cleaning robot travels.

14. The control method of the cleaning robot according to claim 12, wherein the acquiring of the local map includes: